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DERWENT-WEEK: 197846

TITLE: Soldering iron with movable handle - which is detachably secured around the insulation sheath and can be moved along it

PATENT-ASSIGNEE: OKI ELECTRIC CABLE KK[OKIC]

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PATENT-FAMILY:

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ABSTRACTED-PUB-NO: JP53118254A

BASIC-ABSTRACT: A soldering iron comprises a double-shell tubular heat pipe incorporating an electric heater surrounding an upper portion of the heat pipe, and contg. a liq. heating medium; a cartridge tube packed with solder and slidably inserted into the inner shell of the heat pipe; an insulation sheath surrounding the heater and part of the heat pipe; and a handle detachably secured on the insulation sheath.

By moving the handle along and around the insulation sheath, the grip portion extending parallel to the axial length of the heat pipe can be placed for convenience of handling.

TITLE-TERMS:
SOLDER IRON MOVE HANDLE DETACH SECURE INSULATE SHEATH CAN MOVE

DERWENT-CLASS: M23 P55

CPI-CODES: M23-A03;

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審査請求 有

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⑤4半田鏝

相模原市上鶴間1268—1 ルネ東林間E棟603号

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明　細　書

1.発明の名称

半田鏝

2.特許請求の範囲

(1) ヒートパイプ端部に半田溶融用チップを取付け、このヒートパイプの外周に加熱体を取付けた加熱部を有するヒートパイプを用いた半田鏝において、前記加熱部の外周を断熱材からなる被覆層で覆い、その被覆層の外周に着脱自在な取付具を設けるとともに、この取付具に前記被覆層から所定間隔離して前記ヒートパイプとほぼ平行に柄を固着し、使用条件に応じて前記取付具の取付位置や方向を任意に変更させるようにしたことを特徴とする半田鏝。

3.発明の詳細な説明

本発明はヒートパイプ応用の半田鏝に関するものである。

本出願人は、さきにヒートパイプの端部に設けられた半田溶融用チップからなる先端部と、前記ヒートパイプの所定個所の周囲に設けられた断熱材からなる把握部と、前記ヒートパイプを加熱する発熱体が設けられた熱供給部とを備えたことを特徴とするヒートパイプ応用の半田鏝を提案したのであるが、ヒートパイプの特性として、その全長にわたってほぼ同温度に温度上昇するため、長時間連続使用する場合は半田鏝全体が温度上昇する点はやむを得ないものであった。この現象は実用上は何等大きな支障はないものの、把握部における断熱材を充分に厚くして把握部の温度上昇を

防ぐ場合は把握部直径が大きくなり、半田鏝の操作が不自由になる欠点があつた。この不自由さは単に直径が大きいため把握が困難であるだけでなく、把握部直径が過大になると半田鏝先端部を作業中注視するのに不自然な作業姿勢が必要となつたり、微細な半田作業の場合鏝の把握部を指先で把握することが不可能なため半田鏝先端部を微妙に操作することが困難である等の問題があつたものである。

本発明は、以上の問題点を解決してヒートパイプ応用の半田鏝の温度上昇に対する対策を施すと同時にヒートパイプの特徴を活用して広範囲な作業に適した操作容易な構造の半田鏝を提供するものである。

以下、図面を参照して本発明の一実施例を説明する。

第１図は本発明構造の半田鏝およびその使用例を示す図面である。第１図に於いて１はヒートパイプ、２は半田熔触用チップを取付けた先端部、３は加熱体、４は断熱材からなる被覆層、５は被覆層４の外周に後述の柄を取付けるための取付具である。６は直径の大きい鉛筆又は万年筆大（以下ペンシル型と称す）の柄で、取付具５に依り片持状態で半田鏝に取付けられてある。このペンシル型の柄６は半田鏝７に接触することなく握ることが出来る様に少くとも鏝７の表面から所定間隔例えば１０粍以上は離れる様に保持されてある。又、把握した時、ヒートパイプ１及びその先端部２と一体感を与える為、任意ヒートパイプ１と平行になる様保持されてあるのも本発明構造の特徴である。取付具５は容易に着脱出来る構造になつて居る。第２図乃至第６図は他の実施例を示すもので、各図は柄６の取付位置および片持構造の柄６の取付方向が異なる場合を示したものである。第２図乃至第６図においては、柄６の取付方向の変更は取付具５を着脱することなく、柄６と取付具５を結ぶ線に支点を設けて柄６を単に１８０度回転させる方法で方向を変える構造にしても良い。然し、鏝７の先端部２の被接着体との接触感触を得るためには各実施例に示してある様な単純で且つ強固な構造の方が望ましい。７は電源コードであり、８は被半田接着体である。

本発明のヒートパイプ応用の半田鏝７は、以上の如き構造であるから、ヒートパイプの非常な利点である反面、欠点でもある管全体が半田接続温度と同程度に上昇することに依る鏝全体の温度上昇に耐えて長時間の半田作業を実施出来るものであり、更に片持ペンシル型の柄はヒートパイプと任意平行に取付けられてあるのでヒートパイプ先端部にある半田熔触用チップとの一体感があり、極めて操作が容易である利点もある。又、この様な構造であるから鏝外周の温度上昇や熱損失を多少無視して、断熱層の厚さを比較的薄くすることに依り、作業中の半田熔触チップの先端を容易に注視しながら作業を実施することが出来るものである。

更に、本発明に係る半田鏝７はその片持ペンシル状の柄の位置や方向を、被半田接続部の位置，形状，精度等に応じ、又は作業者の好みに応じて容易に変更して能率良く接続作業を実施すること

が出来る。これは極めて重要なことで、半田に依る接続作業は作業者の熟練や、作業者の手の受ける感触等に大きくその作業能率や接続信頼性が左右されることは良く経験することであつた。以下各実施例を図面に依つて、本発明半田鏝における柄6の取付位置，方向における各種の特徴について述べる。

第1図および第3図の如き柄6の取付けを行つた場合は、電気アイロンを握る如き握り方で作業する場合に適当である。これ等の場合は比較的精密でない接着や接着対称が大きい場合に能率良く作業することが出来る。第1図と第3図の相違点は第1図の方が第3図の場合より先端部2の先端部に加わる力が柔軟で弾力的である点である。これは柄6の取付部とチップ先端部2の距離の相違に依つて生ずる作用である。従つて、第1図の実施例は第3図の実施例に比して被接着体8が柔軟であつたり、薄肉であつたりする場合に適するものである。又、第1図および第3図は被接着体8の裏側に下方から作業を実施する場合に適して居る。これは第1図および第3図を上下反対にして眺めることに依つて容易に理解することが出来る。第2図および第4図の実施例は柄6を鉛筆やペンを握る如く握つて作業を実施するのに適して居る。従つて、この場合は精密微細な半田接着を実施するのに極めて便利である。

第2図および第4図の間の相違点としては、前述と同様な理由からチップ先端部2と被接着体8との接触は第2図の実施例の方がソフトである点である。然し、熟練者に取つては第4図の実施例の場合の方が作業者の微妙な指先の感覚をより正確にチップ先端部2に伝えることが出来る。然し、一方では作業面における視野は第2図の実施例の方が第4図の実施例の場合より広い利点がある。

第5図の実施例は、第1図および第3図と同様な握り方、又はドライバーを握る如き握り方で作業を実施することが出来るが、第1図および第3図の実施例に比較して極めて視野が広い点が大きな特徴である。この場合の欠点としては、チップ先端部2と作業者の指との距離が長いので精密微細な半田接着には全く不適当である。然し、接着対称が大きく、粗大な接着に対しては極めて能率良く作業を実施することが出来る。

第6図の実施例の場合は、アイスピックケルを握る如き握り方で作業を実施するのに適して居り、接着対称物としては点接着が多い場合に適して居る。比較的精密でない場合のプリント基板等を対称とする場合に利用して便利である。

ヒートパイプ応用の半田鏝は極めて熱効率が良く、半田溶融速度が早い上に、半田溶融チップが小型であるので単一の半田鏝で接着対称物の大型小型，熱伝導率の大小，接着の精密微細，粗雑粗大，等に係わらず半田接着することが出来るので、上述の如き片持ペンシル型の柄の取付位置，方向を変えることに依り各種の用途に使用出来る本発明構造のヒートパイプ応用半田鏝は通常のヒートパイプ応用半田鏝に比して、その特性を完全に活用することの出来る理想的な構造であると云うことが出来る。

以上に詳述した如き、本発明の半田鏝によれば、

ヒートパイプの特徴を活用して広範囲な作業に適したかつ操作の容易な半田鏝が得られ、また、温度上昇に対する対策も充分満足し得る有用性のある半田鏝が得られる。

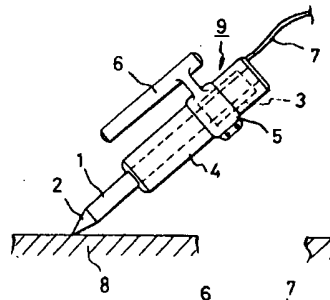
4.図面の簡単な説明

第1図は本発明の一実施例を示す概略構成の正面図、第2図乃至第6図は本発明の他の実施例を示す正面図である。

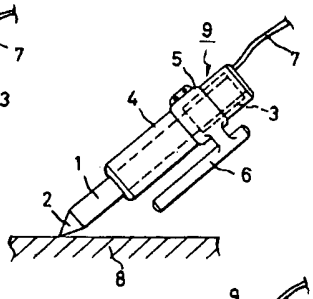
1…ヒートパイプ、2…チップ先端部、3…加熱体、4…被覆層、5…取付具、6…柄、7…コード、8…被半田接着体。

代理人　志　賀　富　士　弥

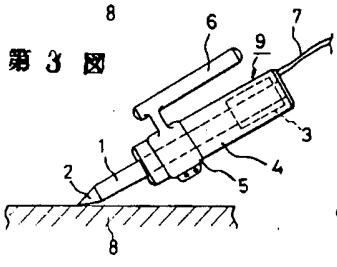
第1図



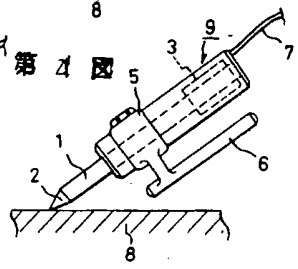
第2図



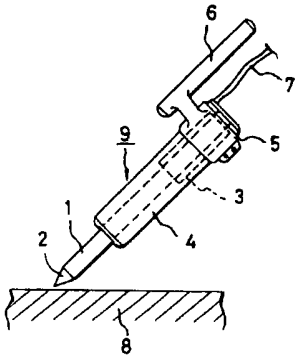
第3図



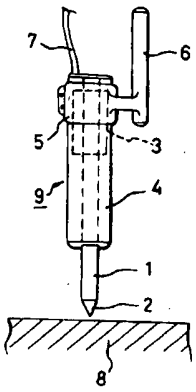
第4図



第5図



第6図



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(54) Title of Invention: Soldering iron

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Specification

1. Title of Invention

Soldering iron

2. What is claimed is

A soldering iron having a heat pipe in which a chip for melting solder is attached in an edge section of the heat pipe, and a heating section in which a heating element is attached in the circumference of the heat pipe, wherein the circumference of said heating section is covered with a coating layer, a detachable attachment tool is provided in the circumference of the coating layer, a grip is firmly fixed on the attachment tool at a predetermined distance from said coating layer and in

approximately parallel with said heat pipe, and attachment locations and directions of said attachment tool can be discretionary changed according to use conditions.

3. Detailed explanation of the invention

The present invention pertains to a soldering iron in which a heat pipe is used.

In the past, the present applicant suggested a soldering iron which is characterized in that the soldering iron is equipped with a tip section comprising a chip for melting solder provided on an edge section of a heat pipe, a grip section composed of a heat insulating material provided in the area surrounding a predetermined parts of said heat pipe, and a heating element to heat said heat pipe. The heat pipe had a property in that it was inevitable to have a temperature increase in the entire soldering iron when it was used continuously for a long period of time, because the temperature increases to an approximately same temperature in the overall length of the heat pipe. This phenomenon did not have any major impact on the actual use of the soldering iron. However, when the heat insulating material in the grip section was made sufficiently thicker to prevent the temperature increase in the grip section,

of a heat pipe and a disadvantage as well. Hence, it enables a soldering operation for a long period of time. Furthermore, the cantilever pencil shaped grip is attached almost in apparel to the heat pipe. Therefore, it has an advantage in that an operator feels that the grip is integrated with a chip for melting solder which is located in the tip section of the heat pipe, and thus operating it is extremely easy. In addition, because of this structure, the heat insulating layer can be made relatively thin without much concern for an increase in temperature of circumference of the iron or a loss of heat. Therefore soldering operation can be conducted while closely observing the tip of the chip for solder melting without any difficulty.

Further, with soldering iron 9 related to the present invention, positions and directions of the cantilever pencil shaped grip can be changed easily according to the location and shape of an object to be soldered and attached, precision and so forth, or depending on a preference of an

operator. Hence, an attaching operation can be conducted efficiently. This is very important because it was commonly experienced that in an attaching operation by a solder, the operation efficiency and the reliability of attachment is greatly influenced by operator's skill or how it feels in the operator's hand. In the below, in reference to figures, examples are explained in terms of characteristics of each iron in attachment locations and directions of grip 6 of the soldering iron of the present invention.

Such attachment of grip 6 as shown in Figure 1 and Figure 3 are suitable for cases in which users conduct operations by gripping the soldering iron as they hold an electric smoothing iron. In these cases, operation can be conducted efficiently when attachments are relatively imprecise or when objects to be attached are large. The difference between Figure 1 and Figure 3 is that in Figure 1, the force applied on the tip portion of tip section 2 is more flexible and elastic compared to the case of Figure 3. This is an effect generated from a difference in the distance between where grip 6 is attached and chip tip section 2. Therefore, the example of Figure 1 is more suitable compared to the example of Figure 3, for the case in which object to be attached 8 is flexible or its thickness is small. Besides, Figure 1 and Figure 3 are suitable for the cases in which on operations are conducted on (illegible) side of object to be attached 8 from below. When Figure 1 and Figure 3 are reviewed upside down, it can be easily understood. Figure 2 and Figure 4 are ideal for cases in which users conduct operations while gripping the soldering iron as they hold a pencil or a pen. Hence, it is extremely useful for a soldering attachment that is fine and precise.

The difference between Figure 2 and Figure 4 is that based on a similar reason with the previously mentioned reason, the contact between chip tip section 2 and object to be attached 8 is softer in the example of Figure 2. However, for skilled operators, they can more precisely convey subtle feelings of their fingertips to chip tip section 2 in the example of Figure 4. Yet, there is an advantage with the example of Figure 2 in that a field of vision during operation is wider compared to that in the example of Figure 4.

In the example of Figure 5, an operation can be conducted by holding the soldering iron as shown in Figure 1 and Figure 3, or by holding it as how to grip a driver. A major characteristic of this example is that the field of vision is significantly wider compared to that in examples in Figure 1 and Figure 3. A disadvantage in this case is that since the distance between operator's fingers and chip tip section 2 is long, it is totally inappropriate for a fine and precise soldering attachment. However, for a large object to be attached and for a coarse attachment, an operation can be conducted with an excellent efficiency.

the example of Figure 6 is suitable for conducting an operation by holding a soldering iron as if to hold an ice ax. As for an object of attachment, it is appropriate for a case in which there are many spot

attachments. It is useful in soldering for print substrates and the like when relatively low precision is required.

A soldering iron using a heat pipe has an excellent thermal efficiency, and the solder melting speed is high. In addition, since a chip for melting solder is small in size, soldering attachment can be conducted regardless of large or small size of objects to be attached, high or low thermal conductivity, preciseness or roughness of attachment, and so forth. In the soldering iron using a heat pipe with the structure of the present invention, the soldering iron can be used for a variety of purposes by changing attachment positions and directions of the above mentioned cantilever pencil shaped grip. Therefore, it can be said that the soldering iron of the present invention has an ideal structure in which its characteristics are fully utilized compared to an ordinary soldering iron using a heat pipe.

According to the soldering iron of the present invention described in the above, a soldering iron

the diameter of the grip section became larger, and thus there was a disadvantage in that it became difficult to operate the soldering iron. Not only that it was hard to grip because of the large diameter, but the difficulties for operation also included problems such that an unnatural position was required in order to observe the tip of the soldering iron closely when the diameter of the grip section was too large, and since it was difficult to grip the grip section of the iron with fingertips, operating the tip section of the soldering iron subtly was difficult in the case of a refined soldering operation.

The present invention is to solve the issues in the above and to implement countermeasures for the temperature increase in a soldering iron using a heat pipe, while providing a soldering iron with an easy-to-operate structure that is suitable for a wide range of operations by utilizing characteristics of the heat pipe.

An example of the present invention is explained in the below in accordance with figures.

Figure 1 a diagram in which a soldering iron with the structure of the present invention and an example of how it is used are shown. In Figure 1, 1 is a heat pipe, 2 is a tip section to which a chip for melting solder is attached, 3 is a heating element, 4 is a coating layer comprising a heat insulating material, and 5 is an attachment tool to attach the grip which will be described later to the circumference of coating layer 4. 6 is a grip of a size of a pencil with a large diameter or a fountain pen (called a pencil shaped grip hereafter), and it is attached by attachment tool 5 to the soldering iron in a cantilever condition. This pencil shaped grip 6 is maintained so that it is distant from the surface of solder iron 9 with a predetermined clearance, for instance 10 millimeters or longer to enable a user to hold it without touching solder iron 9. Moreover, the structure of the present invention is also characterized in that the grip is maintained to be approximately parallel to heat pipe 1 so that an operator can feel that it is integrated with heat pipe1 and its tip section 2 when gripped. Attachment tool 5 has a structure in which the tool is easily attached and detached. Figure 2 through Figure 6 show other examples, and each figure shows a case of different attachment location and attachment direction of grip 6 with a cantilever structure. In Figure 2 through Figure 6, the attachment direction of grip 6 may be changed without detaching attachment tool 5, but through a structure in which a supporting point is provided on an arm connecting grip 6 and attachment tool 5 and grip 6 is simply rotated 180 degrees to change the direction. However, such a simple and firm structure as shown in each example is more desirable in order for a user to feel it when tip section 2 of iron 9 comes in contact with an object to be attached. 7 is a power cord and 8 is an object to be soldered and attached. Soldering iron 9 using a heat pipe in the present invention has such a structure mentioned in the above. Therefore, it resists an increase in the temperature of an entire iron due to an increase in the temperature of an entire pipe to the same temperature as the soldering attachment temperature, which is a significant advantage

which is suitable for a wide range of operations can be obtained by utilizing characteristics of a heat pipe, and a soldering iron which provides sufficient countermeasures for a temperature increase and is useful can be obtained.

4. Brief explanation of figures

Figure 1 is a front elevational view of a schematic constitution to show one example of the present invention. Figure 2 through Figure 6 are front elevational views in which other examples of the present invention are shown.

1: Heat pipe
2: Chip tip section
3: Heating element
4: Coating layer
5: Attachment tool
6: Grip
7: Cord
8: Objected to soldered and attached

Agent for Patent Applicant: Fujiya Shiga

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5